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Informe sobre las Observaciones hechas durante el Eclipse Solar de 30 Noviembre de 1853, presentado al Senor Ministro de Instruccion Publica. Por Carlos Moesta. Santiago de Chile, 1854.

This account of the total eclipse of the sun of November 30, 1853, does not differ from that communicated to the Society in the course of last summer by Admiral Smyth, and of which a translation was given in the *Monthly Notice* for June 1854 (Vol. XIV., p. 225), except that it is accompanied by a drawing of the appearance of the eclipse which some persons may be desirous of inspecting. It may be remarked, however, that the details of the drawing exhibit a satisfactory agreement with the description given in the text.

Astronomische Waarnemingen gedaan ter bepaling der geografische ligging van Batavia door S. H. De Lange en G. A. De Lange, geografische Ingenieurs von Nederlandsch Indië.

(*Communicated by the Astronomer Royal.*)

This Paper, as the title imports, contains the details of a series of observations instituted with a view to determine the longitude of Batavia. These observations consist chiefly of determinations of the zenith-distance of the moon, and of the right ascensions of the moon and moon-culminating stars. They were commenced in 1851, but were interrupted by the unfavourable state of the weather in the month of October in that year, and soon afterwards by the return of MM. De Lange to Manado. They were, however, resumed in May 1853, and continued to be prosecuted pretty regularly till towards the close of the same year.

The observatory consisted of a hut built of bamboos for the occasion, which could be opened with facility in every direction. The instruments with which the observations were made were a universal instrument by Pistor and Martin of Berlin, and a similar instrument by Repsold.

It was found inconvenient to erect a meridian mark; a bamboo was merely fixed in the direction of W.S.W. at a distance of 200 yards from the place of observation; its azimuthal deviation from the meridian having been determined with the utmost possible accuracy. In determining the error of collimation, the method of making one of the telescopes serve as a collimator to the other was very frequently employed. The adjustment of the telescopes upon each other was very conveniently effected.

In the focus of the telescope two vertical wires were placed very near to each other, which could be very accurately brought upon the wires of the telescope employed as the collimator.

In order that an opinion of the value of the observations may

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be formed, a comparison is instituted between the results for right ascension obtained by the two observers on every night of the moon being observed independently by each of them. The following are the outstanding differences:—

s
−0·06
−0·17
+0·06
−0·22
+0·04
−0·29
−0·09
+0·01
−0·05
+0·07

s
+0·13
+0·03
−0·42
+0·56
−0·24
+0·05
−0·16
−0·05
+0·10
−0·55
−0·28

The author estimates the probable error of an observation of right ascension to be $0^{s}·92$, a quantity which, however, he is inclined to think exceeds rather than falls short of the true value.

" The author then proceeds to give an account of the operations of himself and his colleague for determining the longitude from the observed zenith-distances of the moon. The method pursued by them in this instance was suggested by Kaiser, who remarks that it is only applicable in practice when the moon's latitude is small, since the variation in right ascension then takes place almost wholly in altitude.

" In the foci of both instruments," says the author, " I inserted two additional wires on each side of the double horizontal wires which had been already introduced. The instrument being adjusted with all possible precision, the telescope was directed to the moon, when the time of the passage of her limb over each of the horizontal wires was accurately noted and the level of the vertical circle read off. By the aid of a slight previous calculation, it was easy to find the instant of time (and also the corresponding azimuth) when a star in the vicinity of the moon should attain the same altitude. The instrument was then placed in the known azimuth (the vertical circle retaining a fixed position), and the star being brought into the field of view of the telescope by its diurnal motion, the time of its passage over each of the horizontal wires was observed and the level read off. The altitude of the star for the time of observation may be accurately found by calculation, and it is manifest that the apparent zenith-distance of the moon's limb will be equal to the computed zenith-distance of the star, subject to a small correction for the variation of the level corresponding to the interval between the two observations. The following are the advantages of this method:—

" 1°. A small error in the determination of the time does not exercise any sensible influence.

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" 2°. The effect of refraction is eliminated.

" 3°. The method is independent of the unavoidable errors which the observation of zenith-distances entails upon the reading off of the vertical circle. It is also independent of the errors of the instrument, as well as those of the micrometer screws, and of the error of collimation.

" 4°. The observation may be repeated several times."

The following process was employed for deducing the longitude from the observations:—

With an assumed longitude ($7^h\ 7^m\ 37^s$ East) the Greenwich mean time of the observation of the moon's limb was found, and the corresponding right ascension and declination of the moon calculated from the *Nautical Almanac.*

From these data the zenith-distance of the moon's centre was finally calculated, which, if the assumed longitude was correct, ought to agree with the observed zenith-distance. If no such agreement was found to subsist, the difference of the two quantities served to indicate the difference of longitude which would result by repeating the calculation with a longitude greater or less by 10^s than the longitude assumed. The author remarks that the agreement of the results obtained in the same night by this method leaves nothing to be desired, and that the probable error of an observed zenith-distance does not amount to more than $1''\cdot 3$, which on an average agrees with an error of $2^s\cdot 6$ in the longitude deduced from it, a degree of accuracy, he adds, which is not to be obtained by any other method with so small instruments.

The results of the observations are then given. The longitude for each observed zenith-distance is computed, and also the small difference which would result if the assumed longitude were increased by 10^s. The transit-observations next follow with the individual values of the longitude deduced from them. The Paper concludes with the equations of condition for the correction of the longitude based upon a few observed occultations. The method of calculation employed is that given by Professor Challis in the *Nautical Almanac* for 1854.

Telescopic Appearance of the Planet Venus at the time of her Inferior Conjunction, February $28^d\ 1^h\ 45^m$, 1854. By John Drew, Ph. D.

" Having ascertained from the *Nautical Almanac* that on this occasion the heliocentric latitude of *Venus* was nearly at its maximum, I determined to watch her if possible at the time of conjunction; and, as the sky was particularly clear, I succeeded in taking observations of the planet both before and after the occurrence.

" Measurement with the position wire micrometer gave, as nearly as it would admit, $3''$ as the breadth of the illumination: more than half of her circumference was visible, but its extent I